REMARKS

In the final Office Action mailed October 10, 2003, claims 1 and 6 to 17 have been objected to because of informalities, and have been rejected under 35 USC 112, first paragraph, because the language of three times amended claim 1 excludes any presence of the sensitizing semi-conductor at any positions other than the interface between the n-type and p-type semiconductors, this being non-consistent with some parts of Fig. 2.

The Applicants wish to thank the Examiner for these constructive remarks.

Corrections requested under paragraphs 2, 3 and 4 of the Office Action have been duly introduced into proposed amended claim 1.

The feature reciting that said sensitizing semiconductor is located at an inteface between said n-type and said p-type semiconductors has been cancelled from claim 1. Indeed, since all the individual particles of sensitizing semiconductor are adsorbed at the surface of the n-type semiconductor, as recited in claim 1, inherently most of these particles are located at an interface between the n-type and the p-type semiconductors; but, as the Examiner stated accurately, it cannot be excluded that some sensitizing semiconductor particles are located between different portions of the n-type semiconductor. It is submitted that the

claim 1 rejection under 35 USC 112 first paragraph is rendered moot by virtue of this proposed amendment.

Likewise, in claim 10, the previously objected to language "hole conductor" has been proposed to be replaced by the language "p-type semiconductor," as previously requested by the Examiner.

In claim 14, the linking language "as claimed in claim 1" has been proposed to be replaced by the full recitation of the features of claim 1. Thus, proposed amended claim 14 is merely redrafted in independent form incorporating all the limitations of base claim 1.

Proposed amended claim 15 incorporates now the feature previously recited in claim 16, and claim 16 has been cancelled, accordingly.

In claim 17, the objected to terms "layered heterojunction" have been proposed to be replaced by the terms "solid state p-n heterojunction," which is consistent with all other claims. Proposed amended claim 17 recites more precisely the formation of quantum dots in the nanometer range. This feature is supported throughout the specification and more specifically on page 3, lines 13-14. The merits of quantum dots particles in the nanometer range have been discussed thoroughly in the previous communications, and it is therefore submitted that this amendment does not raise up any new issue, nor would necessitate further consideration or additional searches.

Proposed new claim 18, directed to a heterojunction, recites the same features as claim 17 directed to a cell. It is worthwhile to note that the features of claim 17 all pertain to the heterojunction itself. It is therefore submitted that proposed new claim 18 does not raise up any new issue.

Newly proposed dependent claims 19 to 25 are all directed to a cell as claimed in claim 14 and recite merely specific features of the heterojunction comprised within and characterizing the cell of claim 14. Since the features recited in proposed claims 19 to 25 are exactly the same features as those recited respectively in claims 6, 7, 9, 10, 11, 12 and 13, it is submitted that these new proposed claims 19-25 do not raise up any new issue or necessitate further consideration or additional searches.

The newly proposed dependent claims merely complete the two groups of claims presently on file, directed respectively to a heterojunction and to a cell incorporating such a heterojunction. The amendments and new claims place each group of claims in better condition for allowance or for an appeal, independently one from the other.

For the above reasons, entry of the proposed amended claims is respectfully requested.

Turning now to rejection grounds under 35 USC 102 and 35 USC 103, independent claims 1 and 14, as now proposed to be amended, recite a heterojunction wherein the sensitizing semiconductor

consists exclusively of individual particles, said particles being quantum dots, all said quantum dots being adsorbed at the surface of the n-type semiconductor and providing a plurality of individual point contact junctions between said quantum dots and said n-type semiconductor and between said quantum dots and said p-type semiconductor.

In the final Office Action, the Examiner stated that Siebentritt's structure comprises individual quantum dots particles absorbed at the surface of the electron conductor because the chemically deposited CdS permeates the structure of the porous TiO_2. It may be that a fraction of the CdS deposited according to Siebentritt is still in form of individual particles, but since Siebentritt teaches them to apply the dipping process of Vogel a number of repeating times between 20 and 40, it appears that these particles are bigger than 10nm (see table 1, last line of the Vogel reference). Moreover, according to the teaching of Vogel, an important fraction of these particles are clustered, and thereby a large fraction of Siebentritt's CdS particles have no direct contact to the TiO_2 substrate, that is to say an important fraction of these particles are not adsorbed at the surface of the n-type semiconductor itself, and an electron transfer from these particles into TiO_2 can therefore only occur with difficulty or nt at all, thereby inducing the strong decrease of the IPCE observed

when TiO_2 substrate is coated 20 or 30 times (see the Vogel reference, Fig. 3 and page 245, left column, lines 13-25).

In other words, the Siebentritt reference does not disclose a heterojunction as recited in claims 1 and 14, namely a heterojunction wherein the sensitizing semiconductor consists of individual quantum dot particles, all said particles being adsorbed at the surface of the n-type semiconductor and providing the point contact junctions between said quantum dots and said n-type semiconductor and between said quantum dots and said p-type semiconductor. It is therefore submitted that the subject matter of claims 1 and 14 is not anticipated by the disclosure of the Siebentritt reference.

Referring to previous papers, the Applicants set forth that the Vogel reference discloses its deposition process in the framework of making electro-chemical cells, with liquid electrolytes, that is to say liquid junctions, and not solid state junctions. See Vogel, captions to Figs. 3 and 4, and see Siebentritt, page 1823, left column, 3 last lines citing ref. [3]. However, Siebentritt, upon applying the deposition process disclosed by Vogel, for making an all solid state heterojunction, teaches to apply this process in conditions teaching away from the presently claimed invention. It is therefore once more submitted that the presently claimed invention is not rendered obvious by

the disclosure of Siebentritt combined with or incorporating the disclosure of Vogel.

In view of the above, entry of the foregoing proposed claim amendments and new claims is respectfully requested, and reconsideration and allowance of all pending claims over the prior art of record is therefore respectfully requested.

Respectfully submitted,

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